CLAIMS

What is claimed is:

1. A linear compressor having a core combined to one end of a piston to detect a position of the piston reciprocally moving up and down, and a bobbin having a first sensor coil and a second sensor coil detecting the position of the core, comprising:

a controller determining a state of a load of the piston by measuring time that the core takes to exit and enter the bobbin from an inhale stroke through a compression stroke of the piston and controlling a position of the piston on a basis of the determined state of the load.

2. The linear compressor according to claim 1, wherein the core has a length shorter than one half of the length of the first sensor coil and the second sensor coil in series.

3. The linear compressor according to claim 1, wherein the controller increases a top clearance of the piston if the time that the core takes to exit and enter the bobbin increases over a predetermined critical time.

4. The linear compressor according to claim 1, further comprising:

a first branch comprising the first sensor coil and a predetermined first dividing resistor connected in series;

a second branch comprising the second sensor coil and a predetermined second dividing resistor connected in series;

a power source applied to the first branch and the second branch; and

a voltage comparator with input voltages applied from the first dividing resistor and the second dividing resistor.

5. The linear compressor according to claim 4, wherein the voltage comparator receives input voltages applied from the terminals of each of the first sensor coil and the second sensor coil.

6. The linear compressor according to claim 4, wherein the controller determines the state of the load on the piston based on the time that the piston takes to be positioned near the bottom dead center making output of the voltage comparator 0, so as to control the position of the piston.

7. The linear compressor according to claim 5, wherein the controller determines the state of the load on the piston on a basis of difference of time that the piston takes to be positioned near the bottom dead center making output of the voltage comparator 0, so as to control the position of the piston.

8. A control method of a linear compressor having a core combined to one end of a piston to detect a position of the piston reciprocally moving up and down, and a bobbin having a first sensor coil and a second sensor coil detecting the position of the core, comprising:

measuring a time that the core takes to exit and enter the bobbin from an inhale stroke through a compression stroke of the piston; and

controlling a position of the piston by determining state of a load on the piston on a basis of the time that the core takes to exit and enter the bobbin.

9. The control method of the linear compressor according to claim 8, further comprising forming a length of the core to be shorter than a half of length of the first sensor coil and the second sensor coil connected in series.

10. The control method of the linear compressor according to claim 8, further comprising increasing a top clearance of the piston if the time that the core takes to exit and enter the bobbin increases above a predetermined critical time.

11. A method for controlling an operation of a linear compressor, comprising:

timing a core driven by a piston through a stroke cycle;

receiving the time and computing a load on the piston;

outputting a piston position signal based on the load computed; and

controlling a piston stroke according to the piston position signal, by varying the power driving the linear compressor.

12. The method of claim 11, wherein the controlling further comprises controlling the piston stroke, wherein the piston stroke is increased as the load increases and the piston stroke is decreased as the load decreases.

13. The method of claim 11, wherein the controlling further comprises if the load computed is greater than a predetermined critical load amount, then increasing a top clearance of the piston.

14. The method of claim 11, wherein timing the core is based on the elapsed time when the core exits the sensor coil aperture during a compression stroke, and then enters the sensor coil aperture during an inhale stroke of the piston.

15. The method of claim 11, wherein timing the core is based on the elapsed time when the core enters the sensor coil aperture during a compression stroke, and then exits the sensor coil aperture during an inhale stroke of the piston.

16. A linear compressor piston control device, comprising:

a bobbin defining an aperture;

a sensor coil disposed in the bobbin;

a core attached to a piston disposed coaxially in the aperture of the bobbin, wherein the core is less than one half the length of the sensor coil;

a controller controlling a position of the piston by determining a load based on signals from the sensor coil sensing the position of the core.

17. The control device according to claim 16, wherein the controller determines the load based on the elapsed time when the core exits the sensor coil aperture during a compression stroke and then enters the sensor coil aperture during an inhale stroke of the piston.

18. The control device according to claim 17, further comprising the controller adjusting a top clearance of the piston based on the elapsed time.

19. The control device according to claim 18, wherein the controller increases the top clearance if the elapsed time is above a predetermined critical time.

20. The control device according to claim 16, wherein the sensor coil includes a first sensor coil and a second sensor coil.

21. The control device according to claim 20, wherein the first sensor coil and the second sensor coil have the same number of turns, size and inductance value.

22. The control device according to claim 21, wherein the control device further comprises:

a first branch having a first predetermined dividing resistor connected in series with the first sensor coil;

a second branch having a second predetermined dividing resistor connected in series with the second sensor coil.

23. The control device according to claim 22, further comprising:

a voltage comparator that receives voltage inputs from the first branch and the second branch and outputs a comparator signal;

a digital signal processor that receives the comparator signal and sends an output signal to the controller based on the comparator signal.

24. The control device according to claim 23, wherein the controller determines the load by measuring the time that elapses between the comparator signal equaling 0 a first time during a compression stroke and the comparator signal equaling 0 a second time during an inhale stroke.